REMARKS

Applicants appreciate the thorough examination of the present application that is reflected in the Final Office Action. Applicants also appreciate the withdrawal of the prior rejections in view of Applicants' Amendment that was filed on May 25, 2004.

The Final Office Action rejects Claims 1-5, 7, and 9-12 based on U.S. Patent No. 5,991,339 to Bazes et al. (Bazes) in view of a newly cited U.S. Patent No. 6,601,007 to Amir et al. (Amir), and in combination with other secondary references. Applicants respectfully submit that the claims are patentable for, at least, the reasons that are explained in detail below.

The Objections to the Claims Should be Withdrawn:

Claims 1, 6, 7, and 10 have been amended as requested by the Examiner to overcome the claim objections. Applicants respectfully submit that these claim objections should be now be withdrawn.

Rejection of the Claims under 35 U.S.C. § 112 Rejections Should be Withdrawn:

The Office Action rejected Claims 1-12 under 35 U.S.C. § 112, first paragraph, on the following basis:

> In claims 1 and 6-8, applicants have amended the claims to incorporate where in the filter adaptation circuit modifies the amplification control signal based on the comparison and a known training pattern, ... The independent claims of 1 and 7 appear to recite the limitation wherein the circuit is operating in a normal mode, where the switches 235 and 236 has been [sic] to set correspondingly. However, implementation of using the known training pattern is performed during a training mode. How can the normal mode be implemented with the training mode at the same time?

(Final Office Action, pg. 3.)

Claim 1 recites:

> 1.   (Currently Amended) A circuit for adaptively amplifying an input signal, the circuit comprising:

an adaptive filter connected to receive the input signal and to amplify a predetermined frequency range of the input signal by an amount based on an amplification control signal input to the adaptive filter to generate an amplified input signal;

a comparator connected to receive the amplified input signal from the adaptive filter and a predetermined threshold signal, the comparator outputting a comparison signal that compares the amplified input signal to the predetermined threshold signal; and

a filter adaptation circuit connected to receive the comparison signal and to modify the amplification control signal based on the comparison signal and a known training pattern.

An embodiment of the recited "adaptive filter" is shown in FIG. 2 as the programmable filter 210 (also referred to as "the adaptive filter element"). The programmable filter 210 receives the input signal 200, and "adjusts ... high-end frequency components of the received signal" based on an "adjustable gain, K", which is "controlled by filter adaptation circuitry 230." (Specification, pg. 6, line 17 - pg. 7, line 4.) Accordingly, the programmable filter 210 operates as recited in Claim 1, for the adaptive filter, irrespective of whether the equalization apparatus is in the "normal mode" or the "training mode" (i.e., switches 236 and 235 may be in either position). In the training mode, switch 236 connects the comparator 220 to the filter adaptation circuitry 230, and the filter adaptation circuitry 230 adjusts the adjustable gain K.

An embodiment of the recited "comparator" is shown in FIG. 2, as the comparator 200. The comparator 220 outputs a comparison signal to switch 236 based on a comparison of the amplified input signal Vout 370 from the programmable filter 210 and a threshold signal from the adder circuitry 245. In the "training mode", the switch 235 connects to the output of the threshold adjust circuit 240 to generate the threshold signal. Accordingly, the comparator 220 operates as recited in Claim 1 irrespective of whether the equalization apparatus is in the "normal mode" or the "training mode" (i.e., switches 236 and 235 may be in either position).

An embodiment of the recited "filter adaptation circuit" is described in the specification, and is shown in FIG. 2 as the filter adaptation circuitry 230. When the switch 236 is connected to the filter adaptation circuit 230 (i.e., in the training mode), the filter adaptation circuit 230 is connected to receive the comparison signal output by the comparator 220. The filter adaptation circuit 230 then modifies the amplification control signal, which is provided to the programmable filter 210, based on the comparison signal and a "known training pattern." The "known training pattern" is shown in FIG. 5 as training pattern 525, and described as a "data bit pattern" that is "known by equalization apparatuses 110a... 100m before filter adaptation takes place." (Specification, pg. 9, lines 8-10, and pg. 8, lines 1-8). Accordingly, the training pattern 525 is known by the equalization apparatus, and can be present within the filter adaptation circuitry 230. Because the training pattern 525 can be present within the filter adaptation circuit 230, the filter adaptation circuit 230 has access to it irrespective of the position of switches 236 or 235.

The filter adaptation circuit 230 detects a falling edge of the training pattern 525, via D flip flops 500 and 510 and an AND gate 500. When the equalization apparatus is in a "training mode" the threshold adjust circuit 240, shown in FIG. 4, outputs logic signals Below 455 and Belownot 456, which are used by the filter adaptation circuit 230 in combination with the detected falling edge of the training pattern 525 to "determine whether or not the boost gain, K, of adaptive filter element 210, should be increased or decreased." (Specification, pg. 9, lines 10-20.)

Accordingly, Applicants respectfully submit that Claim 1 satisfies 35 U.S.C. § 112, first paragraph based on at the least the descriptions in the Specification that have been identified and explained above.

Independent Claim 7 contains similar recitations to Claim 1 and satisfies 35 U.S.C. § 112, first paragraph for at least the reasons that are explained above for Claim 1.

Dependent Claim 6 recites that the filter adaptation circuit further comprises first and second circuits, embodiments of which are shown in FIG. 5 and described in the Specification at, for example, page 9, line 6 to page 10, line 6. The Final Office Action appears to reject Claim 6 only because of its recitation of the "known training pattern." As described above, the training pattern 525 that is used by the filter adaptation circuit 230 is described in the Specification at, for example, page 9, lines 8-10, and page 8, lines 1-8. Accordingly, Applicants respectfully submit that Claim 6 satisfies 35 U.S.C. § 112, first paragraph for at least the reasons provided above.

Independent Claims 1 and 7 are Patentable Over Bazes et al. in view of Amir:

Amended Claim 1 recites:

1.   A circuit for adaptively amplifying an input signal, the circuit comprising:
        an adaptive filter connected to receive the input signal and to amplify a predetermined frequency range of the input signal by an amount based on an amplification control signal input to the adaptive filter to generate an amplified input signal;
        a comparator connected to receive the amplified input signal from the adaptive filter and a predetermined threshold signal, the comparator outputting a comparison signal that compares the amplified input signal to the predetermined threshold signal; and
        a filter adaptation circuit <u>connected to receive the comparison signal</u> and to modify the amplification control signal <u>based on the comparison signal</u> and a <u>known training pattern</u>.
(Emphasis added.)

Claim 1, and analogous method Claim 7 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Bazes in view of a newly cited Amir. As will be described in detail below, Bazes does not appear to describe or suggest at least the above-underlined recitations of Claim 1, and Amir does not supply the missing teachings.

The Final Office Action now concedes that "Bazes does not explicitly teach wherein the adaptive equalizaton circuit uses a known training pattern." (Final Office

Action, pg. 4, lines 23-24). Applicants also submit that Bazes fails to disclose a filter adaptation circuit that is <u>connected to receive and use a comparison signal</u>, where the comparison signal is generated from a comparison of an amplified input signal to a predetermined threshold signal.

Applicants will first explain how Bazes fails to disclose a filter adaptation circuit that uses a comparison signal as recited in Claim 1, and will then explain why is would not be obvious to modify the teachings of Bazes and Amir to provide a filter adaptation circuit that uses a known training pattern as recited in Claim 1.

Applicants respectfully submit that the Final Office Action erroneously contends that "Bazes teaches a filter adaptation circuit (406) connected to receive the digital comparison signal [d(t) from the detector (404)] to modify the amplification control signal (zero selection signal) based on the digital comparison signal [d(t)]." (Final Office Action, pg. 4, lines 17-19.)

Bazes shows an adaptation control unit 406 in FIG. 4 that receives a "transition data" signal from a clock and data recovery block 410 and a "symbol error" signal from a symbol error detector 412. Bazes describes that the transition data contains "information about the locations and number of transitions in each clock period (e.g., phase information) which is extracted from the detector output signal d(t)." (Bazes, col. 4, lines 27-30). The "transition data signal is provided to the adaptation control unit 406, which can then perform an average jitter determination, and cause the parameters of the variable filter 402 to be varied accordingly until the average jitter is minimized". (Bazes, col. 4, lines 30-34). The symbol error detector 412 "determines whether the data carried by the receive data signal is valid at the bit level." (Bazes, col. 4, lines 37-38). The symbol error signal then "triggers the execution of an adaptation cycle" by the adaptation control unit 406. (Bazes, col. 4, lines 45-46).

Accordingly, the adaptation control unit 406 is not described as, and does not function as, a filter adaptation circuit that is connected to receive a comparison signal that

compares an amplified input signal to a predetermined threshold signal as recited in
Claim 1. Moreover, the Final Office Action does not suggest that Amir supplies this
missing teaching of Bazes, and, Applicants respectfully submit that Amir lacks that
teaching.

The Final Official Action concedes that Bazes does not disclose a filter adaptation
circuit that modifies an amplification control signal based on a know training pattern, but
it then cites to Amir in an attempt to supply that missing teaching. Applicants note that
the Court of Appeals for the Federal Circuit has affirmed that to support combining or
modifying references in a § 103 rejection, evidence of a suggestion, teaching, or
motivation to combine or modify must be *clear and particular*, and this requirement is
not met by merely offering broad, conclusory statements about teachings of references.
In re Dembiczak, 50 USPQ2.d 1614, 1617 (Fed. Cir. 1999). In an even more recent
decision, the Court of Appeals for the Federal Circuit has stated that, to support
combining or modifying references, there must be particular evidence from the prior art
as to the reason the skilled artisan, with no knowledge of the claimed invention, *would
have selected these components for combination in the manner claimed*. *In re Kotzab*,
55, USPQ2d 1313, 1317 (Fed. Cir. 2000).

The reason provided for the combining the teachings of Bazes and Amir at Page 5
of the Final Office action is not appropriate. In particular, Page 5 of the Final Office
Action states that:

> Therefore, it would have been obvious to one skilled in the art at the time of the
> invention to receive the known training pattern, as the input signal of Bazes, for
> the purpose of calibrating the adaptive equalization thus accurately and efficiently
> reproducing the input signal, as taught by Amir. (note col. 4, lines 24-42)[.]

Applicants explained in the Amendment filed on May 25, 2004 that not only does Bazes
not disclose the use of a known training pattern by a filter adaptation circuit, it appears to
teach away from the use of a known training pattern by describing, and showing in FIG.
10, a process that determines and seeks to minimize jitter in a received signal based only

on the signal itself. (Amendment, pages 9-10, and Bazes, col. 8, lines 22-28, 33-35, and 48-53). Accordingly, the adaptation control unit 406 does not appear to know, nor have any need to know a priori, a training pattern.

Although Amir discloses the use of a "training sequence", neither Amir nor Bazes provide _clear and particular_ teaching or motivation for why or how one who is skilled in the art would modify the adaptation control unit 406 of Bazes, which minimizes jitter in a received signal based only on the signal itself, to use the "training sequence" of Amir.

Accordingly, Bazes and Amir do not appear to describe or suggest at least a filter adaptation circuit that (1) is connected to receive a comparison signal that compares an amplified input signal to a predetermined threshold signal, and (2) that modifies an amplification control signal based on the comparison signal and a known training pattern, as recited in Claim 1. Consequently, Applicants respectively submit that the Final Office Action has not established a _prima facie_ case of obviousness. Accordingly, Applicants request withdrawal of the rejection of Claim 1.

Claim 7 is a method analog of Claim 1 and is patentable for substantially the same reasons that were described above with regard to Claim 1.

The dependent claims are patentable at least based on the patentability of the independent claims from which they depend as discussed above.
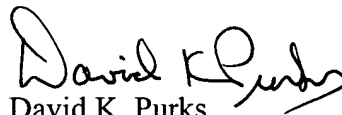
Because Claims 6 and 8 were not rejected based on any cited references, and have been amended to independent form, including all recitations of the claims from which they depend, they are submitted to be in condition for allowance .

In re: Bishop, et al.
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Filed: August 29, 2000
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CONCLUSION

Applicants respectfully request entry of the present claim amendments as placing the claims in condition for allowance, or alternatively as placing the claims in better condition for appeal and narrowing the issues for further consideration on appeal. No new issues are raised by the present claim amendments. In light of the above amendments and remarks, Applicants respectfully submit that the above-entitled application is now in condition for allowance. Favorable reconsideration of this application, as amended, is respectfully requested. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (919) 854-1400.

Respectfully submitted,

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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on October 7, 2004.

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